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E7.3 10.43.2
CR-131222

ENVIRONMENTAL STUDY OF ERTS-A IMAGERY
LAKE CHAMPLAIN BASIN AND VERMONT

Proposal No: SR 347
GSFC ID No: UN 137
Contract No: NAS5-21753

Principal Investigator: Dr. A. O. Lind
Bi-monthly report for period ending March 1, 1973

1973

(E73-10432) ENVIRONMENTAL STUDY OF
ERTS-A IMAGERY LAKE CHAMPLAIN BASIN AND
VERMONT Bimonthly Report, period ending
1 Mar. 1973 (Vermont Univ.) 4 p HC
\$3.00

N73-20393

Unclas
CSCL 08H G3/13 00432

Work Accomplished:

Land use and lake turbidity mapping was the focus of most of the ERTS-1 imagery analysis effort during this reporting period which is in the continuing analysis phase. Major land use classes were identified and mapped in two rural sites and one urbanized test site. Analyses and mapping were performed by use of enlargements presented at a scale of nearly 1:84,000 on Spectral Data's multispectral viewer screen. Land use was mapped directly from the screen and transferred by projection in inch to the mile base maps (State land use mapping scale). Use of seasonal imagery was found to be very helpful in identification of rural land uses and using October 10 imagery, it was possible to begin to differentiate among different cropland uses. Winter coverage (January) from ERTS received toward the end of the reporting period received only a first-look analysis during this period, but it was found that maximum subject/background contrast for two major land use classes made the mapping of these far simpler than with summer or fall coverage. Woodland and urban categories are most easily differentiated during winter when snow cover amounts to only a few inches. Moreover, it appears possible to separate woodlands into two categories:

- 1) forest land and
- 2) scrub woodlands.

These categories

are recognized on ERTS imagery by the gray tone levels displayed against the background of snow cover.

Turbidity mapping was completed for the major lake turbidity boundary in the vicinity of Chimney Point, Vermont. Fluctuations in the boundary were mapped on the basis of one summer and one fall ERTS coverage. The boundary represents a major water mass difference between the clear main lake to the north and turbid water of the southern arm of Lake Champlain. Both RBV (July) and MSS (October) imageries were used. A factor in the interpretation of water turbidity was found to relate to wind and water roughness, so for example, light-toned areas appearing to be turbid water in the July coverage were actually submarine bars with very shallow water depths.

The value of seasonal coverage of repetitive nature was again bolstered since in the October scene of the turbidity boundary, winds were strong enough to provide for considerable wave activity. This apparently has no effect on detecting the actual turbid/clear water boundary, but it obliterates the ability to see submerged features such as were seen on the July imagery when winds were less than 3 knots, variable, and the lake was essentially calm in that area.

As a result of the above, it seems necessary to reconsider the analysis of the water roughness

objective which did not seem feasible by the time the Type II Progress Report was submitted.

During this reporting period, preparations were made for the NASA Symposium on Significant Results from ERTS-1. A paper entitled "Environmental Study of ERTS-1 Imagery: Lake Champlain and Vermont" was in preparation for the symposium.

Planned Activity for Next Reporting Period:

The continuing analysis phase in progress will focus on completion of land use mapping (one area outstanding) and a continuing analysis of new seasonal imageries received from NASA, GSC. An analysis of lake ice patterns from the winter coverage (January) with ERTS MSS bands will be in progress since lake ice mapping was an additional objective which the investigators judged to be a significant result from ERTS. Some ground truth activity will be conducted in key areas of the lake pertinent to the objectives of the study.

Preparation pertinent to the NASA symposium on ERTS-1 results continued.

Results:

A separate series of reports on individual new significant results will be forthcoming during the next two reporting periods.